

04.09-02/15/96-01980

**FINAL**

**PROPOSED REMEDIAL ACTION PLAN  
OPERABLE UNIT NO. 8 (SITE 16)**

**MARINE CORPS BASE  
CAMP LEJEUNE, NORTH CAROLINA**

**CONTRACT TASK ORDER 0274**

**FEBRUARY 15, 1996**

*Prepared For:*

**DEPARTMENT OF THE NAVY  
ATLANTIC DIVISION  
NAVAL FACILITIES  
ENGINEERING COMMAND  
*Norfolk, Virginia***

*Under:*

**LANTDIV CLEAN Program  
Contract N62470-89-D-4814**

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## LIST OF ACRONYMS AND ABBREVIATIONS

AWQS	Ambient Water Quality Criteria
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
COPCs	contaminants of potential concern
DoN	Department of the Navy
FFA	Federal Facilities Agreement
HI	hazard index
HQ	hazard quotient
ICR	incremental cancer risk
IRP	Installation Restoration Program
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
NC DEHNR	North Carolina Department of Environment, Health and Natural Resources
NCWQS	North Carolina Water Quality Standard
NOAA ER-L	National Oceanic Atmospheric Administration Effective Range-Low
OU	Operable Unit
PCB	polychlorinated biphenyl
PID	photoionization detector
ppm	parts per million
PRAP	Proposed Remedial Action Plan
RA <sub>s</sub>	risk assessments
RI	remedial investigation
ROD	Record of Decision
SSV	sediment screening value
SSSV <sub>s</sub>	surface soil screening values
SVOC <sub>s</sub>	semivolatile organic compounds
SWSV	surface water screening value
TAL	target analyte list
TCL	target compound list
TOC	total organic carbon
µg/kg	micrograms per kilogram
USEPA	United States Environmental Protection Agency
U.S.	United States
VOC	volatile organic compound

## **INTRODUCTION**

This Proposed Remedial Action Plan (PRAP) describes the Marine Corps Base (MCB) Camp Lejeune's and the Department of the Navy's (DoN) preferred remedial action for Operable Unit (OU) No. 8 (Site 16). Site 16 is located at MCB Camp Lejeune, Onslow County, North Carolina. More specifically, Site 16 (referred to as the Montford Point Burn Dump) is located southwest of the Montford Landing Road and Wilson Drive intersection within the Montford Point development area of Camp Johnson. Figure 1 is a Location Map of OU No. 8 in relation to MCB Camp Lejeune. Figure 2 depicts the topography and general site features of Site 16.

MCB Camp Lejeune and the DoN are the lead agencies issuing this PRAP in order to fulfill the public participation responsibility established under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); and the Federal Facilities Agreement (FFA) between the DoN, United States Environmental Protection Agency (USEPA) Region IV and the North Carolina Department of Environment, Health and Natural Resources (NC DEHNR).

MCB Camp Lejeune and the DoN, with the assistance of the USEPA Region IV and the NC DEHNR, will select a remedy for Site 16 following the public comment period and the review and consideration of information submitted during this time. Depending on public comments and/or new information, the Final Record of Decision (ROD) may recommend a different remedial action than is presented in this PRAP.

The primary objectives of this PRAP are: to identify the preferred remedial alternative for Site 16 and explain the rationale for the preference; to solicit public review of and comments on the preferred remedial alternative; and provide information concerning public involvement in the remedial action selection process.

This PRAP summarizes information that can be found in greater detail in the Remedial Investigation (RI) Report prepared for Site 16 and other documents contained in the Administrative Record. This PRAP is not intended to be a substitute for the RI Report, and the DoN encourages the public to review this document in order to gain a more comprehensive understanding of Site 16. The Administrative Record file, which contains information on which the selection of the remedial action will be based, is available for public review at the Onslow County Public Library in Jacksonville, North Carolina and at MCB Camp Lejeune Building 67, Room 238, Camp Lejeune, North Carolina. The public is invited to review and comment on the Administrative Record and this PRAP.

## **SITE BACKGROUND**

### **MCB Camp Lejeune Background**

MCB Camp Lejeune is a training base for the United States (U.S.) Marine Corps located in Onslow County, North Carolina. MCB Camp Lejeune is approximately 45 miles south of New Bern and 47 miles north of Wilmington, North Carolina. The facility covers approximately 236 square miles and includes 14 miles of coastline. The military reservation is bisected by the New River, which flows in a southeasterly direction and forms a large estuary before entering the Atlantic Ocean. The eastern border of MCB Camp Lejeune is the Atlantic shoreline; while U.S. Route 17 and State

Route 24 border the western and northwestern boundaries of MCB Camp Lejeune, respectively. The City of Jacksonville, North Carolina, borders the facility to the north.

OUs are formed as an incremental step toward addressing individual site concerns and to simplify specific problems associated with a site or a group of sites. Currently, there are 33 Installation Restoration Program (IRP) sites at MCB Camp Lejeune. These 33 IRP sites have been grouped into 17 OUs, with OU No. 8 being one of the 17 OUs within MCB Camp Lejeune. Site 16 is the only site within OU No. 8.

### **Site Description and History**

As previously noted, Site 16, the Montford Point Burn Dump, is located southwest of Montford Landing Road and Wilson Drive intersection within the Montford Point development area of Camp Johnson. Site 16 is approximately 4 acres in size. Northeast Creek is located approximately 400 feet southeast of the study area and flows in the southwesterly direction towards/into the New River. Camp Johnson is a restricted training area within Camp Lejeune, and no residential areas exist or are planned within its boundaries.

As shown on Figure 2, most of Site 16 is cleared; however, the area which surrounds Site 16 is comprised of pine and hardwood forest. An opening in the southeast corner of the study area leads to Northeast Creek.

Recently, the study area has been used for vehicle staging and for vehicle training exercises. A mock-up jet aircraft is located in the center of the study area. This aircraft is used in refueling exercises by tank truck operators. During these exercises, however, no fuel is used. A four-foot wide ditch, believed to be a fire break, is present in the southwest portion of the study area. This ditch extends around the western side of the former burn dump. There are no permanent structures at Site 16.

Limited information is available concerning the past operational history of the burn dump; however, Site 16 was opened about 1958 and was closed in 1972. Practices at other burn dumps at MCB Camp Lejeune indicate that the Montford Point Burn Dump may have accepted municipal waste or trash from the surrounding housing area and activity buildings. Records indicate that waste oils were also disposed at Site 16. Typically, the debris was burned and then graded to the perimeter of the disposal area so that more debris could be dumped and burned. Asbestos material was once dumped on the surface and has since been removed.

### **Previous Investigations**

No investigations were conducted at Site 16 prior to the RI Report. Therefore, the remainder of this section discusses the RI Report exclusively.

The field program for the RI Report for Site 16, conducted in mid 1994 to early 1995, consisted of a site survey, and sampling of the surface soil, subsurface soil, groundwater, surface water and sediment. The sampling locations associated with these various media are identified on Figure 3.

The site survey task consisted of an initial survey of site features and a post investigation survey of the sampling locations and monitoring wells.

Thirty-two surface soil samples (collected from 0 to 1 foot below ground surface [bgs]) and thirty-five subsurface soil samples (collected from 1 foot bgs to just above the groundwater table) were collected from Site 16 and analyzed for full Target Compound List (TCL) organics and Target Analyte List (TAL) total metals. In order to identify the types of material which may have been disposed of at Site 16, four test pits were also performed as part of the subsurface soil investigation. Samples were not collected from the test pits due to their close proximity to the soil borings, the lack of encountering waste material, and that no elevated photoionization detector (PID) readings were detected.

Six shallow groundwater monitoring wells were installed to determine the presence or absence of contamination in the surficial aquifer which may have resulted from past burning and disposal activities. Groundwater was sampled by using USEPA Region IV's low flow purging and sampling techniques during two rounds of sampling. The first round of groundwater sampling was conducted in November/December 1994, and analyzed for full TCL organics, and TAL total and dissolved metals. In early February of 1995, a second round of groundwater samples was collected and analyzed for full TCL organics and TAL total metals.

Five surface water samples and ten sediment samples (collected from 0 to 6 inches and 6 to 12 inches, were collected along Northeast Creek. Each of the surface water and sediment samples were analyzed for full TCL organics and TAL total metals. In addition, the sediment samples collected at the 0 to 6 inch sampling interval were also analyzed for Total Organic Carbon (TOC), and grain size.

Table 1 presents a summary of the site contamination identified in the surface soil, subsurface soil, groundwater (rounds 1 and 2), surface water and sediments.

In response to a comment from the State of North Carolina, Department of Environment, Health and Natural Resources, four additional surface soil samples were collected within a 10-foot radius of the detected elevated lead sample previously collected from location SB05. The four additional samples were collected from 0 to 1 foot bgs and were analyzed for TAL total metals. The lead results for these four additional surface soil samples were all well within the Base Background results, and ranged from 9.5 mg/kg to 20.5 mg/kg.

## **SCOPE AND ROLE OF RESPONSE ACTION**

No further action is the preferred remedial action for OU No. 8 (Site 16). The no further action decision is the final recommended action for OU No. 8. This decision is based on the findings of the RI field investigation, along with the results of the baseline human health and ecological risk assessments (RAs).

Justification for this decision is presented within the following sections of this PRAP.

## **SUMMARY OF SITE RISKS**

As part of the RI Report, a baseline human health RA and an ecological RA were conducted to evaluate the potential risks associated with exposure to the environmental media at Site 16. The baseline human health RA considered the most likely routes of potential exposure for both current and future risk scenarios. The key findings of each RA are summarized below.

### **Baseline Human Health Risk Assessment**

Five environmental media were investigated during the RI, including surface soil, subsurface soil, groundwater, surface water and sediment. Contaminants of potential concern (COPCs), which are site related contaminants used to quantitatively estimate human exposures and associated health effects, were selected for each of the environmental medium investigated at Site 16. Criteria used in selecting and evaluating the human health COPCs included historical information, comparison of background levels, comparison to field and laboratory blanks, comparison to risk-based concentrations, prevalence, Federal and State criteria, toxicity, comparison to anthropogenic levels, persistence and mobility. Table 2 presents the selected COPCs based on the human health RA. In addition, the contaminants that were detected in the various media and compared to relevant criteria/standards are also identified on Table 2.

As part of the baseline human health RA, a conceptual site model was developed to encompass current and future routes for potential exposure at Site 16. The potential receptors evaluated included current military personnel, future on-site residents (adults and children), and future construction workers. Figure 4 presents the Site 16 conceptual model, highlighting potential sources, migration pathways and potential receptors. As shown, the exposure routes/pathways evaluated with respect to the potential receptors included:

#### **Current Military Personnel**

- Incidental ingestion of surface soil
- Dermal contact with surface soil
- Inhalation of fugitive dust

#### **Future On-Site Residents (adults and children)**

- Incidental ingestion of surface soil
- Dermal contact with surface soil
- Inhalation of fugitive dust
- Ingestion of groundwater
- Dermal contact with groundwater
- Inhalation of VOCs while showering
- Incidental ingestion of surface water
- Dermal contact with surface water
- Incidental ingestion of sediment
- Dermal contact with sediment

### Future Construction Workers

- Incidental ingestion of subsurface soil
- Dermal contact with subsurface soil
- Inhalation of fugitive dust in subsurface soil

As part of the baseline human health RA, incremental cancer risk (ICR) values and hazard index (HI) values were calculated for each of the exposure routes and potential receptors. ICR refers to the cancer risk that is over and above the background cancer risk in unexposed individuals. ICRs are determined by multiplying the intake level with the cancer potency factor. The calculated risks are probabilities which are typically expressed in scientific notation (i.e., 1E-04). For example, an ICR of 1E-04 means that one additional person out of ten thousand may be at risk of developing cancer due to excessive exposure at a site if no actions are conducted. The USEPA acceptable target risk range is 1E-04 to 1E-06. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as a hazard quotient (HQ). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the HI can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The HI refers to noncarcinogenic effects and is a ratio for the level of exposure to an acceptable level for all contaminants of potential concern. An HI greater than or equal to unity (i.e., 1.0) indicates that there may be a concern for noncarcinogenic health effects.

Table 3 presents individual media ICRs and HIs, as well as total site ICRs and HIs calculated for Site 16. As shown on Table 3, all of the media/potential receptors evaluated had ICRs within the USEPA's acceptable target risk range of 1E-04 to 1E-06. Therefore, the potential receptors are not at risk from carcinogens from the soil, groundwater, surface water and/or sediment from Site 16. All of individual medium and potential receptors evaluated had HIs less than 1.0. The total HI value for future residential children; however, had a total HI equal to 1.19. This total HI value indicates that adverse noncarcinogenic health effects may occur. Exposure to soil, via incidental ingestion in particular, drives the total noncarcinogenic risk for future residential children. The presence of Aroclor 1254, a polychlorinated biphenyl (PCB), in surface soil contributed 52 percent of the risk associated with soil ingestion by future residential children.

### Ecological Risk Assessment

An ecological RA was conducted at Site 16 to evaluate if past disposal practices at Site 16 potentially adversely impacted the ecological integrity of aquatic and terrestrial communities on, or adjacent to, the site. The ecological RA identified surface water, sediment and surface soil as the media of concern for Site 16. The ecological COPCs identified in the RI Report are presented on Table 4.

The criteria used in selecting the ecological COPCs included historical information, prevalence, toxicity, Federal and State criteria, comparison of field and laboratory blank data, comparison to background, and comparison to anthropogenic levels.

Overall, four inorganics (aluminum, barium, iron, and lead), along with the volatile organic compound (VOC), 4-Methyl-2-pentanone, were the only ecological COPCs retained for the surface



water aquatic receptors. The ecological COPCs for the surface water terrestrial receptors included all of the noted aquatic COPCs, and the contaminants vanadium and 1,1,2,2-Tetrachloroethane.

No semivolatile organic compounds (SVOCs), pesticides or PCBs were detected in any of the sediment samples. Carbon disulfide and the inorganics, silver and vanadium, were retained as ecological COPCs. Inorganics, pesticides, PCBs, and SVOCs appear to be the most significant COPCs retained for surface soil.

Manganese was the only COPC in the surface water that exceeded a surface water screening value (SWSV), while silver was the only COPC in the sediment that exceeded a sediment screening value (SSV). Overall, a slight potential adverse impact to aquatic receptors is expected from manganese (in the surface water), and silver (in the sediment). However, these contaminants do not appear to be site-related since there is no correlation between the sample concentration and the proximity of the sample to the site.

Several COPCs in the surface soil exceeded their respective surface soil screening values (SSSVs). Most of the surface soil samples collected at Site 16 were located in areas that are bare and/or gravel covered, as they are used for vehicle storage and maneuvers. There are also some exceedances of the SSSVs in the wooded areas surrounding the open area; therefore, there is the potential for adverse impacts to terrestrial flora and fauna in these areas as well. No areas of dead or stressed vegetation were visually observed during either the field investigations or the habitat characterization. Although COPCs in these areas do exceed SSSVs, the exceedences are not expected to be ecologically significant to the terrestrial floral or faunal population due to the current use of the land, most of which is not conducive to habitats of the modeled ecological receptors.

There is a slight potential risk to the cottontail rabbit from contaminants at Site 16. The rabbit's diet is 100 percent vegetation. Since most of Site 16 is unvegetated, the rabbit will not ingest vegetation at most of the Site 16 stations, the model overestimates the risk to the rabbit. Therefore, there does not appear to be a significant risk to the rabbit from site-related COPCs.

The majority of the risk to the raccoon was due to aluminum in the surface water. Since the aluminum is not site-related, there does not appear to be a significant risk to the raccoon from site-related COPCs.

No threatened or endangered species are known to occur at Site 16; therefore, no adverse impacts to these species from contaminants at Site 16 are expected. Likewise, no wetlands have been identified at Site 16; therefore, no adverse impacts to wetlands from contaminants at Site 16 are expected.

In summary, a potential decrease in the aquatic receptor population from site-related COPCs is not expected. Similarly, a potential decrease in the terrestrial vertebrate receptor population from site-related COPCs is not expected.

## **DESCRIPTION OF THE NO FURTHER ACTION PREFERRED REMEDIAL ALTERNATIVE**

As noted previously, the preferred remedial alternative for OU No. 8 (Site 16), is no further action. Since the human health RA indicated a potential noncarcinogenic risk under the future residential child scenario, an evaluation was conducted to determine if this exceedance generated an area of concern at Site 16. During the RI Report and this evaluation, a total noncarcinogenic risk under the future residential child scenario was identified at 1.19. This total noncarcinogenic risk only slightly exceeds the acceptable noncarcinogenic risk level of 1.0, and was primarily driven by the presence of the PCB, Aroclor 1254, in the surface soil.

Currently, there are no standards or criteria that can be applied to soil. Therefore, the soil data collected during the RI Report could not be compared to any set of standards to identify an area of concern. As noted on Table 1, several inorganic constituents exceed Base background concentrations for the surface and subsurface soils. Upon review, it appears that there is little correlation between the elevated metals concentrations in the surface soil and the subsurface soil. The PCB concentrations were; however, evaluated against the USEPA guidance for the cleanup of PCBs under CERCLA. Aroclor 1254 was detected in 13 of the 29 surface soil samples at concentrations ranging from 41 micrograms per kilogram ( $\mu\text{g/kg}$ ) or 0.041 parts per million (ppm) to 2,100  $\mu\text{g/kg}$  or 2.1 ppm. The guidance, which is not a regulation, suggests that PCBs be remediated to 1,000  $\mu\text{g/kg}$  or 1 ppm for residential areas and between 10 to 25 ppm for industrial areas. Since the detected concentrations of PCBs at Site 16 did not present an unacceptable current or future carcinogenic human health risk, and since the maximum detected concentration (i.e., 2.1 ppm) is below the suggested remediation limit for industrial areas (i.e., 10 to 25 ppm), remediation of the PCBs did not appear to be warranted for the protection of human health at Site 16. In addition, only 3 of the 13 detected concentrations (i.e., 2.1 ppm, 1.2 ppm, and 1.1 ppm) only slightly exceeded the suggested remediation limit for residential areas (i.e., 1.0 ppm).

At this point, it is important to clarify that Site 16 is located in the second largest land use category (i.e., classroom training facilities) of the Montford Point development. As previously noted, the site has been and is currently used for vehicle staging and training exercises. Montford Point is one of the oldest areas and has seen little planning over time. Based on the latest Base Master Plan, Site 16's land use category is not expected to change.

As indicated on Table 1, benzene was the only VOC detected above its Federal Maximum Contaminant Level (MCL) and North Carolina Water Quality Standard (NCWQS) during the first round of groundwater sampling. Benzene was not detected, however, during the second round of sampling. Bis(2-Ethylhexyl)phthalate and iron were the only SVOC and inorganic concentrations, respectively, that exceeded their MCL and/or NCWQS. Bis(2-Ethylhexyl)phthalate only slightly exceeded its NCWQS during both rounds of sampling, while the iron was only detected in one of six samples.

Table 1 also identifies surface water exceedances above Ambient Water Quality Criteria (AWQC) for the contaminants 1,1,2,2-Tetrachloroethane (VOC), bis(2-Ethylhexyl)phthalate (SVOC), and the inorganics arsenic and manganese. All of these contaminants were collected approximately one quarter mile downstream of Site 16; therefore, may not be directly site-related. Although arsenic

was detected in surface and subsurface soils, it did not trigger a human health risk for any of the media and only slightly exceeded its AWQC.

Silver was the only contaminant detected in the sediments slightly above the National Oceanic Atmospheric Administration Effective Range-Low (NOAA ER-L), and was only detected in one out of ten samples.

In conclusion, it is important to recall that no human health risks were identified for any of these exceedances, and based on the above information, no areas of concern were identified at Site 16. Therefore, no further action is deemed appropriate. This alternative involves taking no further remedial actions (including sampling), at the site and leaving the environmental media as they currently exist. The no further remedial action decision is justifiable, as the conditions at Site 16 appear to be protective of human health and the environment.

## **COMMUNITY PARTICIPATION**

Community involvement is a critical part of the selection of the remedial action alternatives. The information in this section of the PRAP is provided in order to obtain input from the community relating to the selection of the remedial action alternative for MCB Camp Lejeune, OU No. 8 (Site 16).

### **Public Comment Period**

The public comment period for this PRAP for OU No. 8 (Site 16), MCB Camp Lejeune will begin on February 19, 1996 and end on March 20, 1996. Written comments regarding this PRAP should be sent to:

Commander  
Atlantic Division Naval Facilities Engineering Command  
1510 Gilbert Street (Building N-26)  
Norfolk, Virginia 23511-2699  
Attention: Ms. Katherine Landman, Code 18232

or

Commanding General  
ACIS EMD (IRD)  
Marine Corps Base  
PSC Box 20004  
Camp Lejeune, North Carolina 28542-0004

### **Information Repository**

A collection of information related to OU No. 8 (Site 16) including the Administrative Record, is available for review at the following locations:

Onslow County Public Library  
58 Doris Avenue East  
Jacksonville, North Carolina 28540  
(910) 455-7350

Hours of operation:  
Monday - Thursday: 9:00 a.m. to 9:00 p.m.  
Friday - Saturday: 9:00 a.m. to 6:00 p.m.  
Sunday: Closed

MCB, Camp Lejeune  
Building 67, Room 238  
Marine Corp Base  
Camp Lejeune, North Carolina 28542  
(910) 451-5068

Hours of operation:  
Monday - Friday: 7:00 a.m. to 4:00 p.m.  
Saturday - Sunday: Closed

### **Operable Unit No. 8 Questions**

Should any questions regarding this PRAP arise, please contact one of the following individuals:

Commanding General  
AC/S EMD (IRD)  
Marine Corps Base  
PSC Box 20004  
Camp Lejeune, North Carolina 28542-0004  
Attention: Mr. Neal Paul  
(910) 451-5068

Commander  
Atlantic Division  
Naval Facilities Engineering Command  
1510 Gilbert Street (Building N-26)  
Norfolk, Virginia 23511-2699  
Attention: Ms. Katherine Landman, Code 18232  
(804) 322-4818

Remedial Project Manager  
USEPA, Region IV  
345 Courtland Street, NE  
Atlanta, Georgia 30365  
Attention: Ms. Gena Townsend  
(404) 347-3016

NC Department of Environment, Health, and Natural Resources  
Division of Solid Waste Management  
Superfund Section  
P.O. Box 27687  
Raleigh, North Carolina 27611-7687  
Attention: Mr. Patrick Watters  
(919) 733-2801

Community Information Line  
Public Affairs Office  
Marine Corps Base  
PSC Box 2004  
Camp Lejeune, North Carolina 28542-0004  
Attention: Major Stephen Little  
(910) 451-5782

**Mailing List**

If you are not currently on the mailing list and would desire to receive further publications pertaining to OU No. 8 (Site 16), please complete the requested information and mail this form to:

Commanding General  
AC/S EMD (IRD)  
Marine Corps Base  
PSC Box 20004  
Building 67  
Camp Lejeune, NC 28452-0004  
Attention: Mr. Neal Paul

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Affiliation: \_\_\_\_\_  
Phone: (     ) \_\_\_\_\_

## **TABLES**

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TABLE 1

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
			Region III RBCs (µg/kg)		(µg/kg)	(µg/kg)		RBCs		
Surface Soil	Volatile Organic Compounds	Methylene chloride	85,000	NE	6J	15J	3/29	NA	0	--
		Acetone	780,000	NE	11J	1200	3/29	NA	0	--
		Toluene	1,600,000	NE	1J	4J	3/29	NA	0	Central
	Semivolatile Organic Compounds	Phenol	4,700,000	NE	70J	70J	1/29	NA	0	Western
		1,4 Dichlorobenzene	27,000	NE	43J	43J	1/29	NA	0	Surface Drainage Area
		Naphthalene	310,000	NE	36J	36J	1/29	NA	0	Southern
		2-Methylnaphthalene	NE	NE	67J	67J	1/29	NA	NA	Southern
		Phenanthrene	NE	NE	52J	99J	3/29	NA	NA	Western/Southwestern
		Anthracene	2,300,000	NE	100NJ	100NJ	1/29	NA	0	Southern
		Fluoranthene	310,000	NE	46J	46J	1/29	NA	0	Surface Drainage Area
		Pyrene	230,000	NE	39J	110J	3/29	NA	0	Scattered
		Butyl Benzyl phthalate	1,600,000	NE	64J	64J	1/29	NA	0	Southern
		Benzo(a)anthracene	880	NE	43J	43J	1/29	NA	0	Western
		Chrysene	88,000	NE	43J	70J	4/29	NA	0	Southern
		bis(2-Ethylhexyl)phthalate	46,000	NE	37J	49	6/29	NA	0	Scattered
		Benzo (b)fluoranthene	880	NE	54J	88J	2/29	NA	0	Scattered
		Benzo (k) fluoranthene	8,800	NE	84J	84J	1/29	NA	0	Surface Drainage Area
		Benzo (a) pyrene	88	NE	42J	130J	2/29	NA	1	Scattered
		Indeno (1,2,3-cd) pyrene	880	NE	52J	52J	1/29	NA	0	Southern
		Benzo (g,h,i) perylene	NE	NE	92J	92J	1/29	NA	NA	Southern

TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
Surface Soil (Cont.)	Pesticides/ PCBs		Region III RBCs (µg/kg)		(µg/kg)	(µg/kg)		RBCs		
		delta-BHC	NE	NE	4.7	4.7	1/29	NA	NA	Surface Drainage Area
		Aldrin	38	NE	3.4J	3.4J	1/29	0	NA	Western
		Dieldrin	40	NE	5.6	77J	10/29	1	NA	Scattered
		4,4'-DDE	1,900	NE	5	440	26/29	0	NA	Scattered
		Endrin	2,300	NE	6.5	14J	3/29	0	NA	Southwestern
		Endosulfan II	47,000 <sup>(9)</sup>	NE	1.9J	26J	8/29	0	NA	Scattered
		4,4'-DDD	2,700	NE	2.6J	120	20/29	0	NA	Widespread
		Endosulfan Sulfate	NE	NE	4.8J	4.8J	1/29	NA	NA	Northern
		4,4'-DDT	1,900	NE	3.8	540J	24/29	0	NA	Widespread
		Methoxychlor	39,000	NE	4.6J	4.6J	1/29	0	NA	Western
		Endrin ketone	NE	NE	4.2	9.9	2/29	NA	NA	Western
		Endrin aldehyde	NE	NE	4.6	29	9/29	NA	NA	Scattered
		alpha-Chlordane	NE	NE	3.1J	120	11/29	NA	NA	Scattered
		gamma-Chlordane	NE	NE	1.6J	72J	9/29	NA	NA	Scattered
		Aroclor-1254	160	NE	41	2,100	13/29	8	NA	Scattered
		Aroclor-1260	NE	NE	50J	210J	2/29	NA	NA	Scattered



TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
Surface Soil (Cont.)	Inorganics		Region III RBCs (mg/kg)	Base Background (mg/kg)	(mg/kg)	(mg/kg)		RBCs	Base Background	
		Aluminum	7,800	17.7 - 9,570	866J	18,500J	29/29	1	1 <sup>10</sup>	North/northwest
		Arsenic	0.43	0.065 - 3.9	2.3	24.7J	17/29	17	11	Scattered
		Barium	550	0.65 - 20.8	3	334	29/29	0	9	Scattered
		Beryllium	0.15	0.02 - 0.26	0.24	0.49	6/29	6	2	Western
		Cadmium	3.9	0.04 - 0.6	1.8	9.6	2/29	1	2	Scattered
		Calcium	NA	4.25 - 10,700	66.4J	112,000J	25/29	NA	6	Scattered
		Chromium	39	0.33 - 12.5	2.2	43.2J	27/29	1	3	Scattered
		Cobalt	470	0.185 - 2.355	6.3	6.3	1/29	0	1	Northwest
		Copper	310	0.5 - 87.2	2.2J	543J	24/29	1	2	Scattered
		Iron	2,300	69.7 - 9,640	470	69,700	24/29	19	3	Scattered
		Lead	NA	0.47 - 142	3.8J	5,210J	28/29	NA	2	Central to Northwest
		Magnesium	NA	2.55 - 610	32.5	2,520	23/29	NA	1	Northwest
		Manganese	39	0.87 - 66	2.8J	1,030J	25/29	3	1	Scattered
		Mercury	2.3	0.01 - 0.08	0.11J	14	9/29	2	9	Scattered
		Nickel	160	0.6 - 3.55	24.4	24.4	1/29	0	1	Northwest
		Potassium	NA	1 - 416	205	475	10/29	NA	1	Central
		Selenium	39	0.075 - 1.3	1.1	6	8/29	0	5	Scattered
		Silver	39	0.0435 - 4.3	1.2	3.1	2/29	0	0	--
		Sodium	NA	4.7 - 126	26.8	63.4	11/29	NA	0	--
		Thallium	NA	--	2.1	3.6	2/29	NA	--	--
		Vanadium	55	0.305 - 18.2	2.3J	45.4	28/29	0	2	Scattered
		Zinc	2,300	0.3 - 28.3	14.2J	4,350J	17/29	1	13	Scattered

TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
			Region III RBCs (µg/kg)		(µg/kg)	(µg/kg)		RBCs		
Sub-surface Soils	Volatile Organic Compounds	Bromomethane	11,000	NE	1J	1J	1/32	0	NA	Northern
		Acetone	780,000	NE	42J	900J	12/32	0	NA	8 exceed 10x maximum blank concentration
	Semivolatile Organic Compounds	1,4-Dichlorobenzene	27,000	NE	50J	67J	2/32	0	NA	Northeast
		1,2,4-Trichlorobenzene	78,000	NE	45J	66J	2/32	0	NA	Northeast
		Naphthalene	310,000	NE	88J	88J	1/32	0	NA	Central
		2-Methylnaphthalene	NE	NE	77J	77J	1/32	NA	NA	Central
		Acenaphthene	470,000	NE	51J	290J	3/32	0	NA	Central to Northeast
		Dibenzofuran	31,000	NE	310J	310J	1/32	0	NA	Central
		Fluorene	NE	NE	680	680	1/32	NA	NA	Central
		Pentachlorophenol	5,300	NE	38NJ	94J	3/32	0	NA	Northwest and Northeast
		Phenanthrene	NE	NE	2,200	2,200	1/32	NA	NA	Central
		Anthracene	2,300,000	NE	380	380	1/32	0	NA	Central
		Carbazole	32,000	NE	180J	180J	1/32	0	NA	Central
		di-n-butyl-phthalate	NE	NE	270J	270J	1/32	NA	NA	Central
		Fluoranthene	NE	NE	1,200	1,200	1/32	NA	NA	Central
		Pyrene	230,000	NE	670J	670J	1/32	0	NA	Central
		Benzo(a)anthracene	880	NE	160J	160J	1/32	0	NA	Central
		Chrysene	88,000	NE	160J	160J	1/32	0	NA	Central
		bis(2-Ethylhexyl)phthalate	46,000	NE	58J	71J	2/32	0	NA	Central to Southwest
		di-n-octyl-phthalate	160,000	NE	46J	46J	1/32	0	NA	Central
		Benzo(b)fluoranthene	880	NE	57J	57J	1/32	0	NA	Central

TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
Sub-surface Soils (Cont.)	Semivolatile Organic Compounds (Cont.)		Region III RBCs (µg/kg)		(µg/kg)	(µg/kg)	RBCs			
		Benzo(k)fluoranthene	8,800	NE	58J	58J	1/32	NA	0	Central
		Benzo(a)pyrene	88	NE	38J	38J	1/32	NA	0	Central
	Pesticides/PCBs	4,4'-DDE	1,900	NE	7.6	36	3/32	NA	0	Northwest
		Endosulfan II	47,000 <sup>(9)</sup>	NE	7.1J	7.1J	1/32	NA	0	Surface Drainage Area
		4,4'-DDD	2,700	NE	52J	52J	1/32	NA	0	Northwest
		4,4'-DDT	1,900	NE	37J	630	2/32	NA	0	Northwest and Surface Drainage Area
		alpha-chlordane	NE	NE	3.8	3.8	1/32	NA	NA	Surface Drainage Area
		gamma-chlordane	NE	NE	2.4J	2.5J	2/32	NA	NA	Surface Drainage Area
		Aroclor-1254	160	NE	40	45	2/32	NA	0	Northwest and Surface Drainage Area

TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
Sub-surface Soils (Cont.)	Inorganics		Region III RBCs (mg/kg)	Base Background (mg/kg)	(mg/kg)	(mg/kg)		RBCs	Base Background	
		Aluminum	7,800	16.9 - 11,000	315J	7,650J	31/32	0	0 <sup>(1)</sup>	--
		Arsenic	0.43	0.033 - 15.4	2.5J	2.5J	1/32	1	0	--
		Barium	550	0.65 - 22.6	1.2	36.5	25/32	0	1	Surface Drainage Area
		Beryllium	0.15	0.01 - 0.31	0.21	0.21	1/32	1	0	--
		Calcium	NE	4.75 - 4,410	31.7	1,400	24/32	NA	0	--
		Chromium	39	0.65 - 66.4	2.4	7.9	24/32	0	0	--
		Copper	310	0.47 - 9.5	2.3J	3.4J	5/32	0	0	--
		Iron	2,300	63.3 - 90,500	268	7,830	25/32	5	0	--
		Lead	NE	0.465 - 21.4	1.1J	68J	26/32	NA	1	Surface Drainage Area
		Magnesium	NE	2.85 - 852	13.7	237	25/32	NA	0	--
		Manganese	39	0.395 - 19.9	0.63J	38.1J	25/32	0	1	Surface Drainage Area
		Mercury	2.3	0.01 - 0.68	0.1J	0.28	3/32	0	0	--
		Potassium	NE	1.05 - 1,250	194	370	9/32	NA	0	--
		Selenium	39	0.085 - 2.4	1.2	1.2	1/32	0	0	--
		Sodium	NE	5.4 - 141	22.7	34.7	9/32	NA	0	--
		Vanadium	55	0.34 - 69.4	2.4	14.1	16/32	0	0	--
		Zinc	2,300	0.32 - 26.6	4.9J	399J	11/32	0	2	Northwest and Surface Drainage Area

TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
			MCL (µg/L)	NCWQS (µg/L)	(µg/L)	(µg/L)		MCL	NCWQS	
Ground- water Round 1	Volatile Organic Compounds	Benzene	5.0	1.0	37	37	1/6	1	1	Central
		Ethylbenzene	700	29	1J	1J	1/6	0	0	--
	Semivolatile Organic Compounds	bis(2-Ethylhexyl)phthalate	6.0	3.0	1J	5J	4/6	0	1	East/Southeast of Burn Dump
		Naphthalene	NE	21	ND	6J	1/6	0	0	--
		Phenol	NE	300	ND	4J	3/6	0	0	--
	Inorganics	Barium	2,000	2,000	24.4J	77.9	6/6	0	0	--
		Calcium	NE	NE	370	13,400	6/6	NA	NA	--
		Iron	300 <sup>(2)</sup>	300	712	712	1/6	1	1	East/Southeast of Burn Dump
		Lead	15 <sup>(3)</sup>	15	3.2J	3.2J	1/6	0	0	--
		Magnesium	NE	NE	1,020	5,090	6/6	NA	NA	--
		Manganese	50 <sup>(3)</sup>	50	9.8J	31.6J	4/6	0	0	--
		Sodium	NE	NE	2,480	16,400	6/6	NA	NA	--
		Zinc	5,000 <sup>(2)</sup>	2,100	80.5	80.5	1/6	0	0	--
Ground- water Round 2	Semivolatile Organic Compounds	Naphthalene	NE	21	4J	5J	6/6	NA	0	Widespread
		bis(2-Ethylhexyl)phthalate	6.0	3.0	1J	5J	3/6	0	1	Scattered
	Inorganics	Aluminum	NE	NE	274	300	2/6	NA	NA	Scattered
		Barium	2,000	2,000	25J	54.1J	6/6	0	0	Widespread
		Calcium	NE	NE	728	6,540	5/6	NA	NA	Widespread
		Iron	300 <sup>(2)</sup>	300	410	410	1/6	1	1	East/Southeast of Burn Dump
		Magnesium	NE	NE	1,380	3,130	6/6	NA	NA	Widespread
		Manganese	50 <sup>(3)</sup>	50	11.4J	24.6J	2/6	0	0	Scattered
		Potassium	NE	NE	1,270	1,290	3/6	NA	NA	Scattered
		Sodium	NE	NE	2,240	14,500	6/6	NA	NA	Widespread

TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
			AWQC (µg/L)	NCWQS (µg/L)	(µg/L)	(µg/L)		AWQC	NCWQS	
Surface Water	Volatile Organic Compounds	4-Methyl-2-pentanone	NE	NE	7J	7J	1/5	NA	NA	--
		1,1,2,2-Tetrachloroethane	0.17	10.8	2J	2J	1/5	1	0	
	Semivolatile Organic Compounds	bis(2-Ethylhexyl)phthalate	1.8	NE	10J	10J	1/5	1	NA	
	Inorganics	Aluminum	NE	NE	4,210J	12,300J	5/5	NA	NA	--
		Arsenic	0.018	NE	2.2J	3.1J	4/5	4	NA	--
		Barium	2,000	NE	22.9	30.4	5/5	0	NA	--
		Calcium	NE	NE	154,000J	173,000J	5/5	NA	NA	--
		Chromium	NE	NE	15.6	15.6	1/5	NA	NA	--
		Iron	300	NE	2,780J	6,650J	5/5	0	NA	--
		Lead	NE	NE	5.5J	13.7	5/5	NA	NA	--
		Magnesium	NE	NE	542,000	615,000	5/5	NA	NA	--
		Manganese	4	NE	17.2	24.4	5/5	5	NA	--
		Potassium	NE	NE	169,000	188,000	5/5	NA	NA	--
		Silver	NE	NE	6.4	8.9	5/5	NA	NA	--
		Sodium	NE	NE	4,240,000J	4,740,000J	5/5	NA	NA	--
		Vanadium	NE	NE	19.6	19.6	1/5	NA	NA	--

TABLE 1 (Continued)

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Media	Fraction	Contaminant	Comparison Criteria	Comparison Criteria	Site Contamination					
					Min.	Max.	Detection Frequency	No. of Detections Above Comparison Criteria	No. of Detections Above Comparison Criteria	Location/Distribution Around Site 16
			NOAA ER-L (µg/kg)	NOAA ER-M (µg/kg)	(µg/kg)	(µg/kg)		NOAA ER-L	NOAA ER-M	
Sediments	Volatile Organic Compounds	Carbon Disulfide	NE	NE	2J	2J	1/10	NA	NA	--
		Toluene	NE	NE	1J	2J	2/10	NA	NA	--
			(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)		NOAA ER-L	NOAA ER-M	
	Inorganics	Aluminum	NE	NE	1,380J	7,460J	10/10	NA	NA	--
		Arsenic	8.2	70	0.8J	4.7J	8/10	0	0	--
		Barium	NE	NE	1.9	10.8	10/10	NA	NA	--
		Beryllium	NE	NE	0.27	0.33	4/10	NA	NA	--
		Calcium	NE	NE	87.4	1,220	10/10	NA	NA	--
		Chromium	81	370	3.9	21.2	10/10	0	0	--
		Cobalt	NE	NE	2.4	3.1	3/10	NA	NA	--
		Iron	NE	NE	336J	9,960J	10/10	NA	NA	--
		Lead	46.7	218	2.3J	6J	10/10	0	0	--
		Magnesium	NE	NE	504	618	3/10	NA	NA	--
		Manganese	NE	NE	1.7	10.5	10/10	NA	NA	--
		Silver	1	3.7	1.2	1.2	1/10	1	0	--
		Sodium	NE	NE	170	1,320	10/10	NA	NA	--
		Vanadium	NE	NE	3.6	29.9	10/10	NA	NA	--
		Zinc	150	410	1.9J	46.4J	10/10	0	0	--

**TABLE 1 (Continued)**

**SUMMARY OF SITE CONTAMINATION  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

**Notes:**

- (1) Detections compared to maximum base background concentration
- (2) SMCL = Secondary Maximum Contaminant Level
- (3) Action Level
- (4) Shaded Boxes indicated detections above comparison criteria
- (5) Endosulfan used as surrogate

NE = No Criteria Established

NA = Not Applicable

J - estimated value

NJ - tentatively identified compound estimated value

ARAR - Applicable Relevant Appropriate Requirement

MCL - maximum contaminant level

NCWQS - North Carolina Water Quality Standard

AWQC - Ambient Water Quality Criteria

µg/L - microgram per liter (ppb)

µg/kg - microgram per kilogram (ppb)

mg/kg - milligram per kilogram (ppm)

NOAA ER-L - National Oceanic Atmospheric Administration Effective Range-Low

NOAA ER-M - National Oceanic Atmospheric Administration Effective Range-Median

"--" = undefined

RBCs - Risk-Based Concentrations, Region III (dated October 4, 1995)



TABLE 2

**CONTAMINANTS OF POTENTIAL CONCERN  
EVALUATED IN THE HUMAN HEALTH RISK ASSESSMENT  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Contaminant	Surface Soil	Subsurface Soil	Groundwater		Surface Water		Sediment	
<b>Volatiles</b>								
Carbon disulfide							X	•
Benzene			X	•				
Toluene							X	•
Ethylbenzene				•				
4-Methyl-2-pentanone					X	•		
1,1,2,2-Tetrachloroethane					X	•		
<b>Semivolatiles</b>								
Phenol				•				
Naphthalene				•				
Phenanthrene	X							
bis(2-Ethylhexyl)phthalate				•		•		
Benzo(a)pyrene	X							
<b>Pesticide/PCBs</b>								
Dieldrin	X							
Aroclor-1254	X							
Aroclor-1260	X							
<b>Inorganics</b>								
Aluminum	X					•		•
Arsenic	X					•	X	•
Barium				•	X	•		•
Beryllium	X						X	•
Cadmium	X							
Calcium				•		•		•
Chromium						•		•
Cobalt								•
Copper	X							
Iron				•		•		•
Lead	X			•		•	X	•
Magnesium				•		•		•
Manganese				•	X	•		•
Mercury	X							
Potassium						•		
Silver						•	X	•
Sodium				•		•		•
Vanadium					X	•	X	•
Zinc				•			X	•

## Notes:

No COPCs were retained for subsurface soil.

X = Selected as a COPC for human health risk assessment.

• = Detected in media; compared to relevant criteria and standards; applicable to the groundwater, surface water and sediment columns.

**TABLE 3**

**TOTAL SITE RISKS CALCULATED IN THE HUMAN HEALTH RISK ASSESSMENT  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Receptors	Soil		Groundwater		Surface Water/Sediment		Total	
	ICR	HI	ICR	HI	ICR	HI	ICR	HI
Current Military Personnel	1.2E-06 (100)	0.13 (100)	NE	NE	NE	NE	1.2E-06	0.13
Future Child Resident	1.4E-05 (62)	0.96 (81)	8.3E-06 (32)	0.2 (17)	1.5E-06 (6)	0.03 (2)	2.6E-05	1.19
Future Adult Resident	6.5E-06 (28)	0.13 (75)	1.6E-05 (69)	0.04 (25)	9.4E-07 (3)	<0.01 (<1)	2.3E-05	0.17
Future Construction Worker	NE	NE	NE	NE	NE	NE	<1.0E-06	<0.01

**Notes:**

ICR = Incremental Lifetime Cancer Risk  
HI = Hazard Index  
( ) = Approximate percent contribution to the total ICR or HI values  
Total = Soil + Groundwater + Surface Water/Sediment  
NE = Not Evaluated for potential receptor

**TABLE 4**

**ECOLOGICAL CONTAMINANTS OF POTENTIAL CONCERN  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Contaminant	Surface Water		Sediment	Surface Soil
	Aquatic receptors	Terrestrial receptors		
<b>Inorganics</b>				
Aluminum	X	X		X
Arsenic				X
Barium	X	X		X
Beryllium				X
Cadmium				X
Chromium				X
Copper				X
Iron	X	X		X
Lead				X
Manganese	X	X		X
Mercury				X
Selenium				X
Silver			X	X
Thallium				X
Vanadium		X	X	X
Zinc				X
<b>Volatiles</b>				
Acetone				X
Carbon disulfide			X	
4-Methyl-2-pentanone	X	X		
1,1,2,2-Tetrachloroethane		X		
Toluene				X
<b>Semivolatiles</b>				
Benzo(a)pyrene				X
Benzo(b)fluoranthene				X
Bis(2-ethylhexyl)phthalate				X
Chrysene				X
Phenanthrene				X
Pyrene				X

**TABLE 4 (Continued)**

**ECOLOGICAL CONTAMINANTS OF POTENTIAL CONCERN  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274**

Contaminant	Surface Water		Sediment	Surface Soil
	Aquatic receptors	Terrestrial receptors		
<b>Pesticides/PCBs</b>				
Alpha-chlordane				X
Gamma-chlordane				X
4,4'-DDE				X
4,4'-DDD				X
4,4'-DDT				X
Dieldrin				X
Endrin				X
Endrin aldehyde				X
Endrin ketone				X
Endosulfan II				X
Aroclor-1254				X
Aroclor-1260				X

X = Retained as ecological COPC

## **FIGURES**

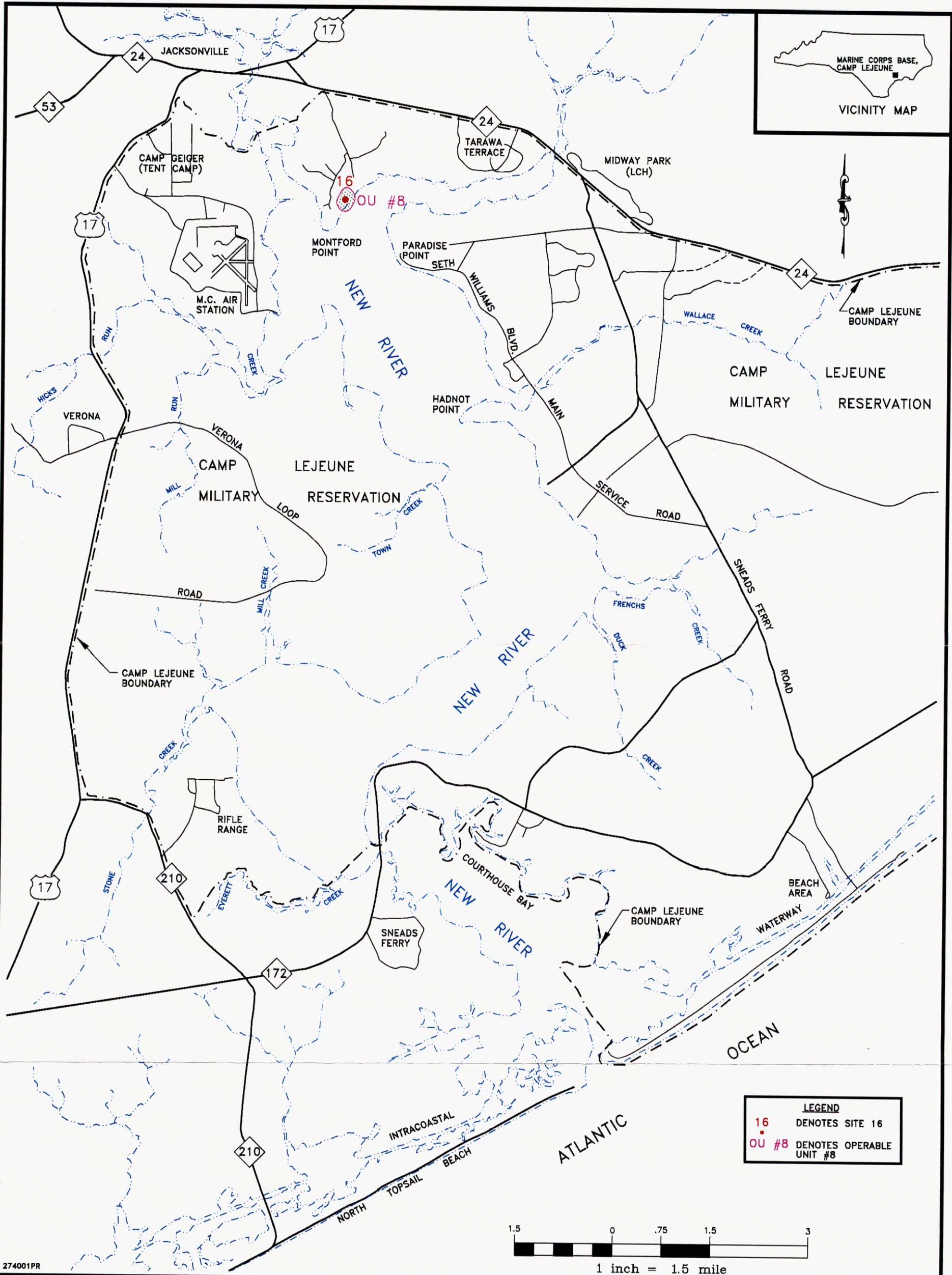
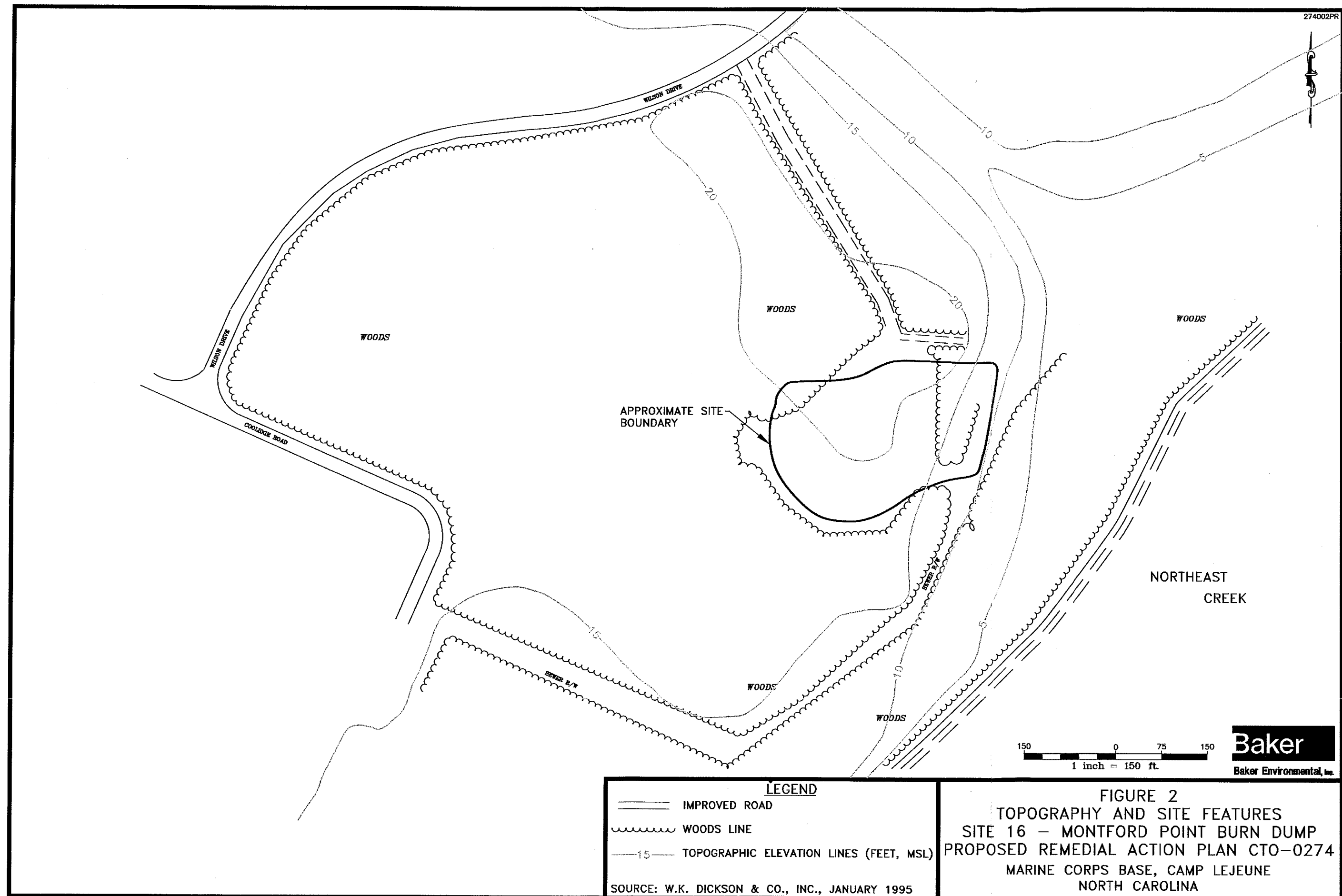


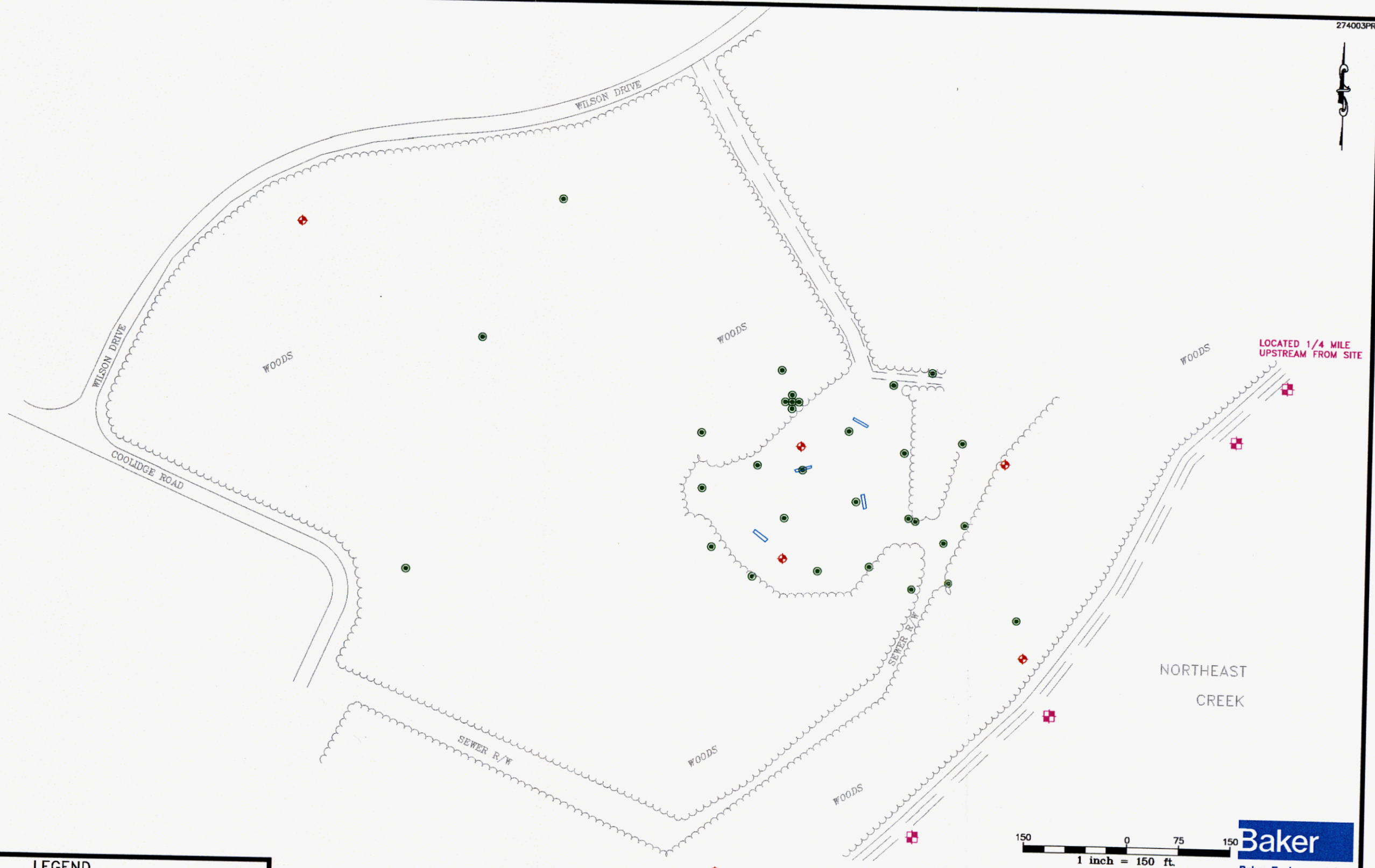
FIGURE 1  
LOCATION MAP  
MARINE CORPS BASE CAMP LEJEUNE  
PROPOSED REMEDIAL ACTION PLAN CTO-0274  
MARINE CORPS BASE, CAMP LEJEUNE  
NORTH CAROLINA

01980 DD61V



01980DD02Z





**LEGEND**

16-MW01 NEWLY INSTALLED MONITORING WELL LOCATION

16-BD-SB01 SOIL BORING LOCATION

SOURCE: W.K. DICKSON & CO., INC., JANUARY 1995

**FIGURE 3**

REMEDIAL INVESTIGATOIN SAMPLING LOCATIONS

SITE 16 - MONTFORD POINT BURN DUMP

PROPOSED REMEDIAL ACTION PLAN

CTO-0274

MARINE CORPS BASE, CAMP LEJEUNE

NORTH CAROLINA

01980DD03Y



FIGURE 4

CONCEPTUAL SITE MODEL  
OPERABLE UNIT NO. 8 (SITE 16)  
MCB CAMP LEJEUNE, NORTH CAROLINA  
PROPOSED REMEDIAL ACTION PLAN, CTO-0274

